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(54) Abstract Title
PRESENTATION APPARATUS

(57) A presentation apparatus comprises a projection device adapted to display pages of information generated by a computer system and a display server connected to the projection device for controlling the display of information by the projection device. The display server includes a wireless receiver for receiving a page of information from a selected one of a plurality of computer systems and means for converting the format of the received page of information into a format suitable for display by the projection device and for transferring the converted information to the projection device.

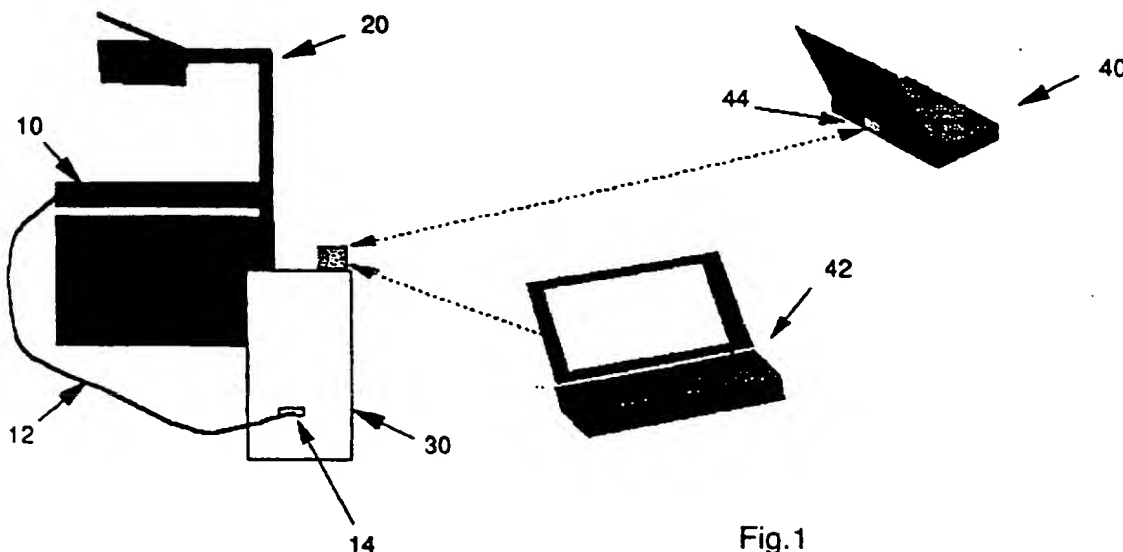
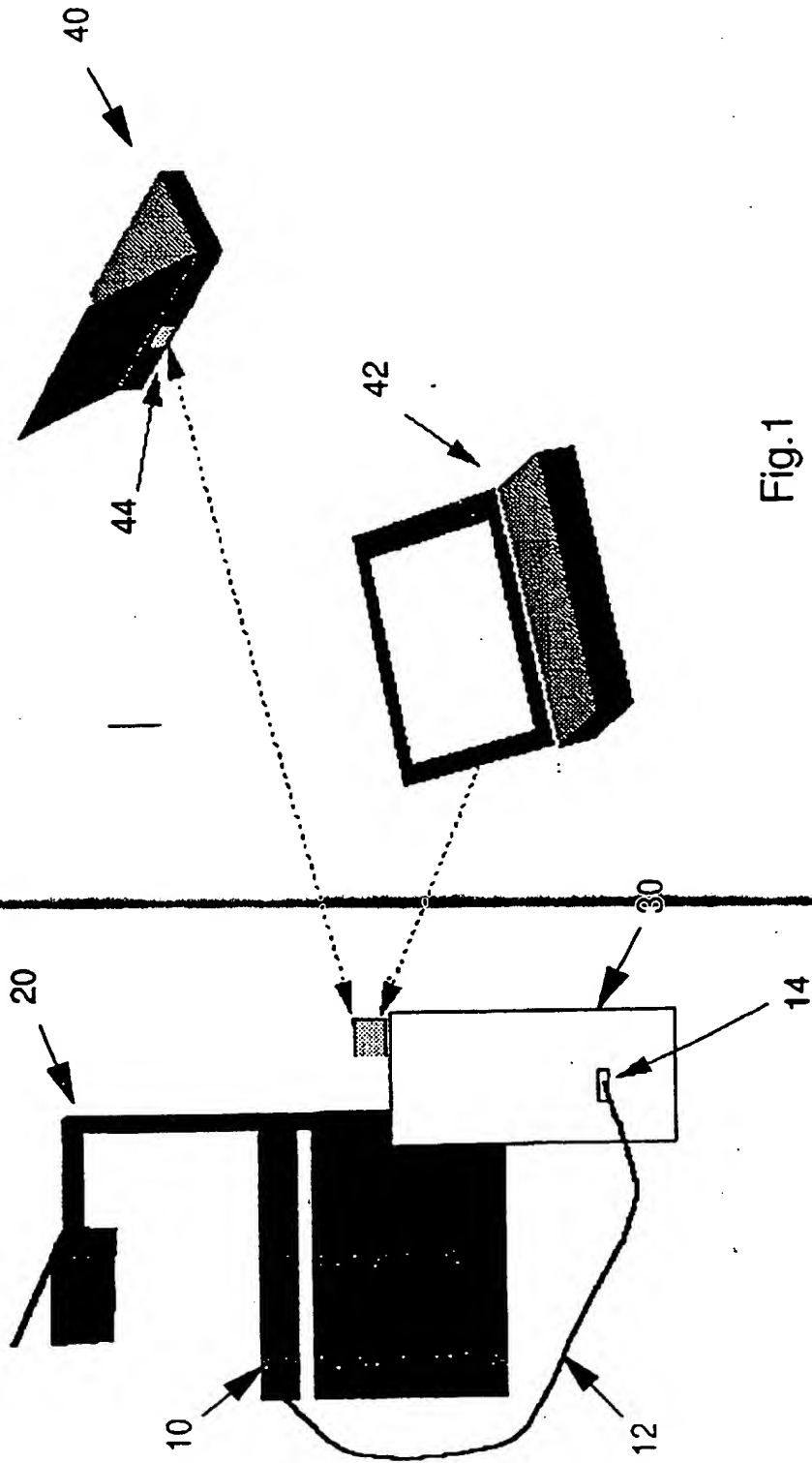


Fig.1

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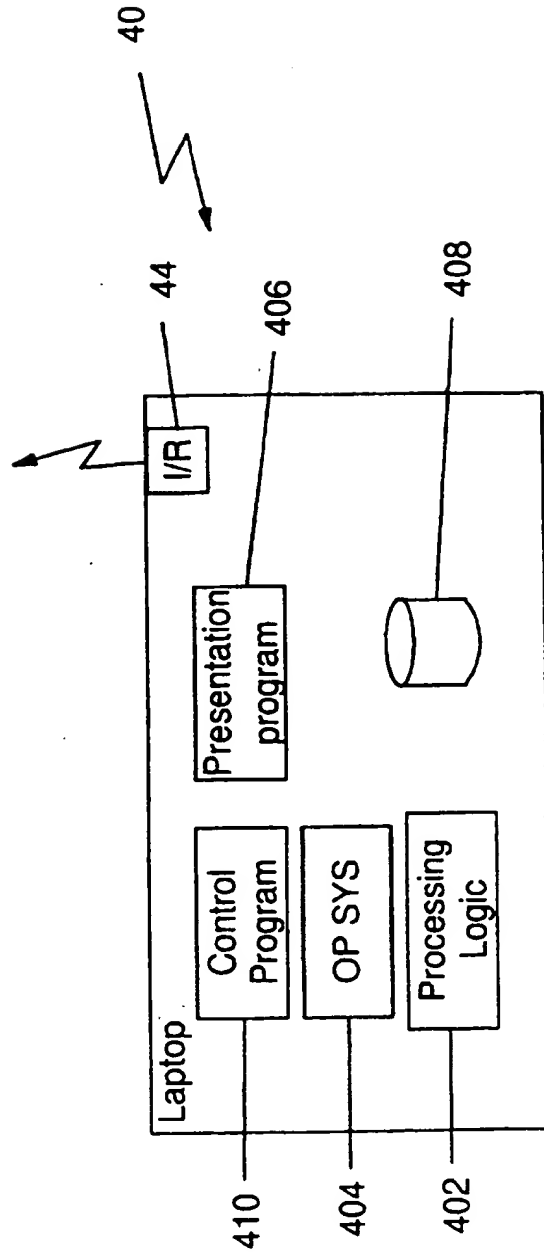
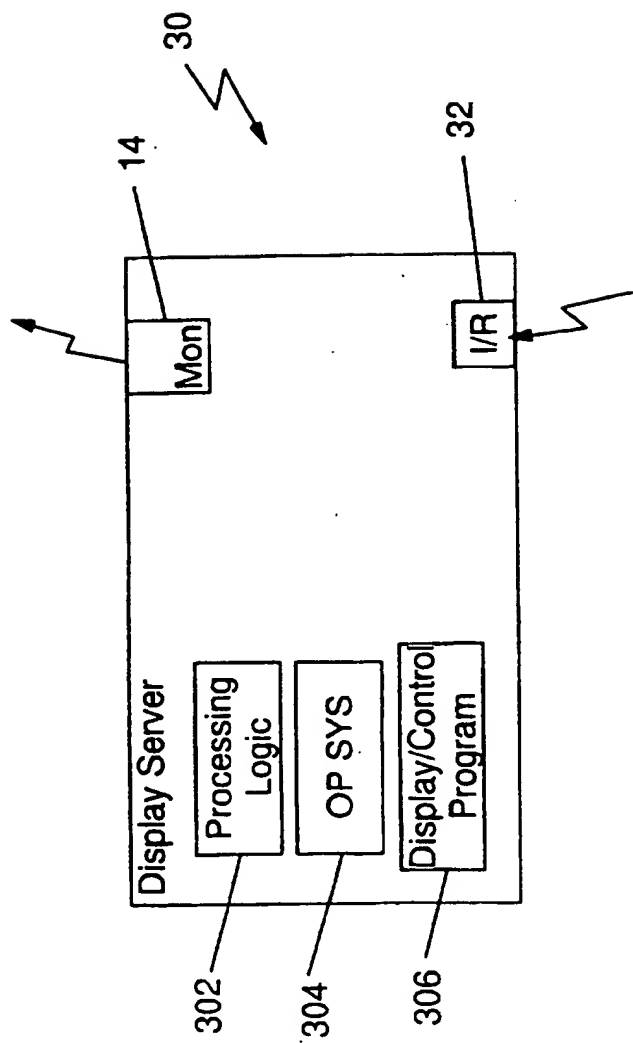


Fig. 2

PRESENTATION APPARATUS

Technical Field of the Invention

5 The present invention relates to a technique for allowing multiple computer systems to display information on a shared projection device.

Background of the Invention

10 Overhead projection (OHP) devices are commonly used in business meetings and the like for facilitating the presentation of information to the meeting attendees. In the past, the information to be presented was typically recorded on a transparent foil which was then placed on the OHP for projection onto a suitable surface. More recently, OHP devices have
15 included the capability to display data from a computer. Typically, the computer is connected to the OHP device which is caused to display the same information which is currently being displayed on the computer system. Such a capability avoids the need to transfer the information onto transparent foils and also allows the person controlling the
20 computer to make last minute changes to the information to be included in the presentation.

 One problem with many existing arrangements lies in the fact that
~~the controlling computer system (e.g. personal computer or laptop) must~~
25 be physically connected to the OHP device. During presentations, this restricts the movement of the person using the computer system and requires him or her to be seated close to the projection device. This problem has been addressed with the Thinkpad model 9545EBK laptop computer system from IBM Corporation (Thinkpad and IBM are registered
30 trade marks of IBM). In this system, the Liquid Crystal Display (LCD) converts into a transparent OHP panel by removal of the back of the display. An infrared remote control allows the user to run the presentation from a distance.

35 An additional problem with existing arrangements, including the Thinkpad system described above, lies in the difficulty of allowing different people to participate in the presentation unless they have loaded their presentation material onto a single computer before the presentation begins. Although this latter problem could be overcome by
40 plugging and unplugging different laptops to and from the OHP device as required during the presentation, such a solution does not lend itself to

a seamless presentation. Furthermore, such a solution may be impractical if the different laptops have different display resolutions and device drivers etc.

5 It would be desirable to devise a technique for allowing multiple presenters, each having a computer system, to share a single OHP device without the need to physically attach each computer system to the device.

Disclosure of the Invention

10 According to a first aspect of the present invention there is provided presentation apparatus comprising: a projection device adapted to display pages of information generated by a computer system; a display server connected to the projection device and for controlling the display
15 of information by the projection device, the display server including a wireless receiver for receiving a page of information from a selected one of a plurality of computer systems, the display server further including means for converting the format of the received page of information into a format suitable for display by the projection device and for
20 transferring the converted information to the projection device.

The display server of the present invention thus acts as an interface between the projection device and the selected computer system which allows the computer system to control the display of information on
25 the projection device without the need for it to be physically attached. The display server preferably comprises a personal computer including, as the wireless receiver, an infrared port for communicating with infrared transmitters on the plurality of computer systems. The display server could alternatively take the form of a laser printer engine adapted for
30 IR reception of a Postscript data stream.

In one advantageous arrangement, the transmitted information is formatted according to the Postscript page definition language and the means for converting the received information includes Ghostscript
35 software for converting the postscript page into a bitmap for display by the projection device.

40 According to a second aspect of the invention, there is provided a method for allowing multiple computer systems to display information on a shared projection device, the projection device being attached to and controlled by a display server, which server includes a wireless receiver

for receiving the information to be displayed from each of the computer systems, the method comprising the steps of: receiving via the wireless receiver a page of information from a selected one of the computer systems; and converting, at the display server, the page of information into a format suitable for display by the projection device.

According to a third embodiment of the invention, there is provided a portable computer system adapted for communication with a presentation apparatus according to the first aspect of the invention, the portable computer system including an infrared transmitter for transmitting pages of information to the display server for display by the projection device, the portable computer system including program code means for manipulating a pointer on the display of the projection device.

According to a fourth aspect of the present invention, there is provided a display server for connecting to a projection device adapted to display pages of information generated by a computer system, the display server including a wireless receiver for receiving a page of information from a selected one of a plurality of computer systems, the display server further including means for converting the format of the received page of information into a format suitable for display by the projection device and for transferring the converted information to the projection device.

A preferred embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings.

Brief Description of the Drawings

Figure 1 is a schematic representation of the presentation apparatus of the present invention;

Figure 2 is a schematic representation of the display server and laptop shown in Figure 1.

Detailed Description of the Invention

With reference first to Figure 1, there is shown a presentation apparatus according to a preferred embodiment of the present invention. A conventional LCD OHP panel 10 is located on a conventional high intensity

OHP device 20. The OHP panel is connected via cable 12 to a standard monitor connection 14 at a display server 30. The display server may take the form of a conventional personal computer system including an infrared (IR) transmitter/receiver 32 for receiving IR signals representing pages of presentation information to be displayed by the OHP panel and OHP device. In the present embodiment, the IR signals are provided by laptop computers 40, 42 (e.g. Thinkpad systems from IBM Corporation) which are each equipped with an IR port 44 which is internally connected to one of the serial ports of the laptop system.

As will be described, the display server receives the presentation information which is transmitted from each laptop in a suitable format such as a Postscript data stream. The advantage of using Postscript in the present embodiment is that it is a device independent standard enabling the laptops transmitting the data to use exactly the same mechanism as if they were transmitting to an IR connected printer. The display server includes a Postscript display program such as Ghostscript (developed by Aladdin Enterprises) which is designed to process the Postscript data by converting it to bitmap images for display via the OHP panel and device. Alternatively, the display server could comprise a modified laser printer engine including a raster image processor adapted to receive the postscript data and for converting it for display on the OHP device.

In Figure 2, there are shown the main elements of the display server and laptop computer necessary to an understanding of the present invention.

As is conventional, the laptop computer 40 includes processing logic 402 (including CPU, chipset, graphics function). An operating system (e.g. Windows 95) 404 provides the interface between the processing logic and application software, including presentation generation software 406 for preparing pages of presentation information for display on the OHP device. Once generated, the pages of presentation information are stored on a mass storage device 408. As described above, the laptop further includes IR port 44. The operating system includes a Postscript printer device driver which is configured with the output directed to the laptop serial port (and hence IR port) rather than to the parallel port (which would conventionally be the case if the IR port was to communicate with a printer). IR communication is carried out in adherence to the Infrared Data Association (IrDA) specification which

defines the error detection and correction necessary to ensure error-free data delivery from the laptop to the server.

5 In the present embodiment, the display server 30 is essentially a conventional personal computer system including processing logic 302 and an operating system 304, which may again be Windows 95. The server is provided with an IR port 32 adapted to receive IR data for processing by the processing logic. As has already been described, the display server also includes a display/control program for processing Postscript data
10 and control codes received at the IR port 32. The control program includes or references the Ghostscript software for converting the incoming Postscript data into bitmap images for display on the OHP device. The display server also includes a standard monitor connector 14 for attachment to the OHP LCD panel 10 of Figure 1.

15 When the user of one of the laptops wishes to display information via the OHP device, he/she brings the page of information onto his screen and presses the PrtSc (Print Screen) button on the laptop or alternatively selects the print option for the page of information
20 currently on display. The data is interpreted into a Postscript datastream by the Postscript printer device driver and transmitted in this form by the IR port. On receipt of the IR data, the display server converts the datastream, by means of the Ghostscript convertor and processing logic, into a bitmap file for transfer via the monitor port
~~and cable to the OHP panel.~~
25 and cable to the OHP panel.

30 In this way, a laptop user can cause information to be presented via the OHP device without the need to be physically connected to the device.

35 In addition, it is possible for other laptop users to send presentation information to the OHP device. However, in accordance with the IrDA specification mentioned above, the second user is prevented from interrupting the presentation of the first user without permission. As defined by the IrDA, Primary and Secondary roles are defined for participating laptop computers. When a first user establishes and holds a link to the display server, it will assume the primary role in the communications which ensures that no other laptop user is able to disrupt the communication flow with the display server until such time as the
40 currently active user chooses to yield control to another user. If another user attempted to gain control, the server would refuse the

connection (since it already has an active link) and the user would be advised that another user was already in control of the display server.

Thus, a simple technique has been described which allows multiple presenters, each having a computer system, to share a single OHP device without the need to physically attach each computer system to the device. Furthermore, no additional software is required on the laptop computers for the technique to function.

However, in one enhanced arrangement, a control program (indicated at 410 in Figure 2) is provided on each laptop which provides extra functionality. The control program is designed to allow the laptop user to point to areas on the display using a pointing device such as a mouse and also to annotate or highlight parts of the displayed information. The display server is adapted to generate these images on a separate bitplane from the underlying presentation so that it is possible to quickly remove them and return to the original image.

The same control program can also be designed to page forward and backward in the presentation thus enabling the entire presentation to be transmitted to the display server at the start so as to avoid delays while a new page is being downloaded to the server. In order for the control program to page forward and backward, the display server should contain enough memory to enable more than one page to be held in the server. If the display server does not include sufficient memory to hold all the pages of the presentation (if for example, the pages include detailed graphics), a portion of the presentation can be sent to the server. Since it is unlikely that the presenter will need to go back prior to the previous page, only one previous page needs to be maintained in the server memory thus freeing more memory for a page further on in the presentation. By preloading as many undisplayed pages as possible, the presentation can flow without undue delays while images are downloaded.

The control program is designed to communicate with the display server using the laptop IR port directly i.e without using the postscript driver. In order for the display server to be able to distinguish the control data stream from the normal postscript data stream, the control program uses ASCII characters in the range 128-255. This provides the required distinction because the postscript data usually contains only

the printable character set plus space, tab and newline. The control program is set-up, to send control codes for the following commands:

Page Forward Presentation

5 Page Backward Presentation

Move pointer to X,Y (X and Y are specified as percentages of screen width and height with the origin at the bottom left)

Show Pointer

10 Hide Pointer

Start drawing using colour R,G,B

Stop drawing

15 In this alternative arrangement, the display server includes a corresponding control program to detect and act on the commands from the laptop.

20 It will be appreciated that although, in the foregoing description, the laptop computers and display server communicate using infrared, any other suitable non-wired connection techniques such as RF may be employed.

CLAIMS

1. Presentation apparatus comprising:

5 a projection device adapted to display pages of information generated by a computer system;

10 a display server connected to the projection device and for controlling the display of information by the projection device, the display server including a wireless receiver for receiving a page of information from a selected one of a plurality of computer systems, the display server further including means for converting the format of the received page of information into a format suitable for display by the projection device and for transferring the converted information to the
15 projection device.

2. Presentation apparatus as claimed in claim 1 wherein the display server comprises a personal computer including, as the wireless receiver, an infrared port for communicating with infrared transmitters on the
20 plurality of computer systems.

3. Presentation apparatus as claimed in claim 2 wherein the projection device is an LCD display panel for use with an overhead display apparatus.
25

4. Presentation apparatus as claimed in claim 2 wherein the projection device is an LCD projector.

5. Presentation apparatus as claimed in any preceding claim wherein the received information is formatted according to the Postscript page definition language and the means for converting the received information includes Ghostscript software for converting the postscript page into a bitmap for display by the projection device.
30

6. A portable computer system adapted for communication with the presentation apparatus of any preceding claim including an infrared transmitter for transmitting pages of information to the display server for display by the projection device, the portable computer system including program code means for manipulating a pointer on the display of
35
40 the projection device.

7. A method for allowing multiple computer systems to display information on a shared projection device, the projection device being attached to and controlled by a display server, which server includes a wireless receiver for receiving the information to be displayed from each of the computer systems, the method comprising the steps of:

receiving via the wireless receiver a page of information from a selected one of the computer systems;

converting, at the display server, the page of information into a format suitable for display by the projection device.

8. A display server for connecting to a projection device adapted to display pages of information generated by a computer system, the display server including a wireless receiver for receiving a page of information from a selected one of a plurality of computer systems, the display server further including means for converting the format of the received page of information into a format suitable for display by the projection device and for transferring the converted information to the projection device.

9. A display server as claimed in claim 8 comprising a personal computer including, as the wireless receiver, an infrared port for communicating with infrared transmitters on the plurality of computer systems.

10. A display server as claimed in claim 8 or claim 9 wherein the received information is formatted according to the Postscript page definition language and the means for converting the received information includes Ghostscript software for converting the postscript page into a bitmap for display by the projection device.



Application No: GB 9803966.2
Claims searched: all

Examiner: R F King
Date of search: 16 April 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): H4T[TBAX]

Int CI (Ed.6): G06F 13/00

Other: ONLINE: WPI, COMPUTRE

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0 691 619 A2 [RANK XEROX] See abstract	1, 6, 7 and 8
"	US 5,189,287 A [Raoul Parienti] See abstract	"

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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